

-4-

**REMARKS**

The Examiner now rejects claims 1, 3 and 5 under 35 U.S.C. 102(b) as being anticipated by Sid-Ahmed (U.S. Patent No. 5,621,470); and rejects claims 2, 4 and 6 under 35 U.S.C. 103(a) as being unpatentable further in view of Zhu et al ("Zhu" – U.S. Patent No. 6,069,664). Applicant has amended the specification paragraphs [0007] and [0008] to provide the issued patent number for the patent application referenced therein.

In contradistinction to Applicant's claimed invention Sid-Ahmed discloses a method for doubling the number of pixels per horizontal line, the number of horizontal lines and the number of frames per second at a receiver without requiring changes to a transmission standard, i.e., converting an interlaced television signal (NTSC, PAL or SECAM) to a progressive scan television signal having enhanced images, to achieve the requirements of improved definition television (IDTV). The standard definition interlaced video signal is digitized (if not already in digital form) and stored in a video random access memory (VRAM) 400, 401 as a two-dimensional image – one frame every 1/30 second. The two-dimensional image from the VRAM is read out twice per 1/60 second and processed by a 3-D interpolator 406 having a throughput frequency of eight times the sampling frequency to double the number of pixels per line, the number of lines per frame and the number of frames per second. The optimum 3-D interpolator is a 3-D lowpass filter having a 3-D IIR filter transfer function that carries out the interpolation of the expanded and replicated images making use of the Sampling theorem, and is not indicated as being adaptive.

The Examiner asserts that Sid-Ahmed discloses all the claimed subject matter: the claimed up-sampling means being met by the two VRAMs 400, 401 where the whole frame is read at twice the frame rate at which each frame is written; and the claimed

-5-

filtering means is met by the 3-D lowpass digital filter 406 to provide a flicker-free image display. Applicant respectfully traverses this improper and nonobvious conclusion by the Examiner. Applicant points out in the Background of the Invention, where one frame is displayed for two or more display frame periods, the prior solution is to interpolate between frames so that there is an interpolated frame of video for each display frame, but that such solutions (linear function, frame repeats, spline function or the like) do not have any human vision model components. Sid-Ahmed is in line with the admitted prior art as not providing interpolation with any human vision model components, assumes flicker-free operation by providing 60 frames per second based on frame replication, i.e., frame repeats, and is limited in up-sampling by factors of two.

Applicant recites in claims 1, 3 and 5 up-sampling a slow rate video signal to a desired rate which is not limited only to factors of two, i.e., between lower rate video/film standards and slow motion video to a higher rate video standard for example. In fact Applicant recites a frame rate converter as the up-sampling element in claim 3, so only frame rate is implicated and not also image expansion as in Sid-Ahmed. Applicant submits that up-sampling implies to one skilled in the art more than just frame rate doubling. Applicant also recites an adaptive HVM filter to produce a smooth interpolated video signal at the desired rate. Sid-Ahmed does not disclose an adaptive HVM filter, i.e., does not generate adaptive filter coefficients for each pixel processed based on a perceptual parameter such as local average luminance, contrast, etc. Human vision model filtering, as disclosed in the referenced U.S. Patent No. 6,907,143, implies filtering based on such perceptual parameters. Thus claims 1, 3 and 5 are deemed to be allowable as being neither anticipated nor rendered obvious to one of ordinary skill in the art by Sid-Ahmed.

-6-

With regards to claims 2, 4 and 6 the Examiner cites the fact that in Zhu "the PTI converter 10 and ITP converter 20 provide the restoration of the full vertical resolution corresponding to a progressive video signal from a conventional interlaced video source provided by any progressive film scanner or other similar device where at least one of the horizontal scan lines have been repeated or replaced with a constant value" as being equivalent to the claimed d.c. level restoration recited by Applicant. However there is no indication of any d.c. level restoration occurring in Zhu, as restoring d.c. level requires adding a value to the up-sampled smooth interpolated video signal to restore the d.c. component of the slow rate video signal which was eliminated by the HVM adaptive filter. Zhu merely indicates that horizontal scan lines may be repeated or replaced with a constant value – this has nothing to do with d.c. restoration. Therefore Zhu does not provide this element, and any conceivable combination of Zhu with Sid-Ahmed does not produce the invention as recited in claims 2, 4 and 6. Thus claims 2, 4 and 6 also are deemed to be allowable as being non-obvious to one of ordinary skill in the art over Sid-Ahmed in view of Zhu and as depending from claims 1, 3 and 5 deemed to be allowable.

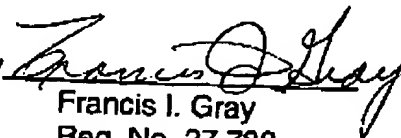
In view of the foregoing amendment and remarks allowance of claims 1-6 is urged, and such action and the issuance of this case are requested.

Respectfully submitted,

KEVIN M. FERGUSON

TEKTRONIX, INC.  
P. O. Box 500, MS 50-LAW  
Beaverton, Oregon 97077  
(503) 627-7261

7217 US

By   
Francis I. Gray  
Reg. No. 27,788  
Attorney for Applicant